DIGBOI COLLEGE
(AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE

Syllabus for FYUGP in Computer Science

(For Semesters I-IV)

PROGRAMME STRUCTURE FYUGP IN COMPUTER SCIENCE

Year	Semester	Course	Title of the Course	Total Credit
Year 01	1st Semester	CCSC101T	Introduction to Programming	3
		CCSC101P	Practical	1
		MINCSC101T	Fundamentals of Computer Science	3
		MINCSC101P	Practical	1
		MDCCSC101T	Basic concept of Hardware and Software	2
		MDCCSC101P	Practical	1
		AEC101		4
		VAC101		2
		SECCSC101T	Fundamentals of PC Software	2
		SECCSC101P	Practical	1
Total Credit				**20**
	2nd Semester	CCSC202T	Database Structure	3
		CCSC202P	Practical	1
		MINCSC202T	Cyber Security	3
		MINCSC202P	Practical	1
		MDCCSC202T	Office Automation Tools	2
		MDCCSC202P	Practical	1
		AEC202		4
		VAC202		2
		SECCSC202T	HTML and CMS Tools	2
		SECCSC202P	Practical	1
Total credit				**20**
	3rd Semester	CCSC303T	Database Management System	3
		CCSC303P	Practical	1
		CCSC304T	Object Oriented Programming using C++	3
		CCSC304P	Practical	1
		MINCSC303T	Introduction to DBMS	3
		MINCSC303P	Practical	1
		MDCCSC303T	Basics of AI	2
		MDCCSC303P	Practical	1

		VACCSC303T	Option1: Digital Fluency OR Option2: Digital and Technological Solutions	2
Year 02		SECCSC303T	Multimedia Applications and Tools	2
		SECCSC303P	Practical	1
		Total credit		**20**
	4th Semester	CCSC405	Numerical Analysis	4
		CCSC406T	Operating System	3
		CCSC406P	Practical	1
		CCSC407T	Digital Design	3
		CCSC407P	Practical	1
		CCSC408T	Computer Architecture	3
		CCSC408P	Practical	1
		MINCSC404T	Operating Systems and Network Management	3
		MINCSC404P	Practical	1
Total credit				**20**

Program Educational Objectives (PEOs)

Program Educational Objectives (PEOs)

Upon completion of the program, graduates will be able to:

- **PEO1:** Compete successfully in the global job market and pursue a professional career in Computer Science.
- **PEO2:** Engage in lifelong learning through higher education and continuous professional development.
- **PEO3:** Communicate effectively and exhibit professional conduct while working in diverse, multidisciplinary teams.
- **PEO4:** Demonstrate social responsibility and environmental awareness in their professional practices.

Program Specific Outcomes (PSOs)

Program Specific Outcomes (PSOs)

After successful completion of the B.Sc. Computer Science program, graduates will be able to:

- **PSO1:** Apply fundamental principles and methodologies of Computer Science across a wide range of real-world applications.
- **PSO2:** Design, develop, and deploy applications of varying complexity using knowledge of programming languages, data structures, algorithms, databases, and networking.
- **PSO3:** Investigate and analyze complex problems by applying appropriate mathematical models and research methodologies to design effective IT products and solutions.
- **PSO4:** Identify and utilize state-of-the-art tools and technologies for the design and development of software systems.
- **PSO5:** Interpret, analyze, and solve computing problems by selecting and applying suitable algorithms and techniques in the field of Information and Communication Technology (ICT).

Program Outcomes (POs)

Program Outcomes (POs)

Upon completion of the program, learners will be able to:

- **PO1:** Formulate, model, and design effective solutions and procedures using appropriate software tools to address real-world problems.
- **PO2:** Design and develop computer programs and systems in areas such as networking, web development, cyber security, cloud computing, IoT, data science, and other emerging technologies.
- **PO3:** Stay informed about current industry trends and research developments to innovate and propose novel solutions to existing challenges.
- **PO4:** Apply core concepts, principles, and theories of computer science to new and unfamiliar contexts.
- **PO5:** Utilize modern techniques, skills, and tools essential for professional computing practice.
- **PO6:** Apply standard software engineering practices and methodologies in the development of real-time projects.
- **PO7:** Pursue advanced studies or seek technical employment in specialized areas of computer science.
- **PO8:** Work effectively both independently and collaboratively as a team member on substantial software development projects.
- **PO9:** Communicate technical concepts and project outcomes clearly and effectively in both written and oral formats.
- **PO10:** Demonstrate ethical behavior and responsible use of internet and cyber technologies.
- **PO11:** Engage in independent and lifelong learning to adapt to the rapidly evolving landscape of the IT industry.

Title of the Course	:	**INTRODUCTION TO PROGRAMMING**	
Course Code	:	**CCSC101T**	
Nature of the Course	:	**Core**	
Total Credits	:	**03**	
Distribution of Marks	:	**End- Semester: 45 TH, In-Semester: 30 TH + 10 PR**	

COURSEOBJECTIVES:

- To develop programming logic
- To solve Mathematical and logical problems
- To explore the use of arrays in different scenarios.
- To learn the Use of conditional statements and loops
- To implement pointers and dynamic memory allocation.

UNITS	CONTENTS	L	T	P	Total Hours
1 **(Marks)** **10TH**	**Introduction to Programming** Algorithm, Flowcharts, Character set, Variables and dentifiers, Built-in Data Types, Variable Definition. Arithmetic Operators and Expressions,	09	01	00	10
2 **(Marks)** **10TH+6PR**	**Conditional Statements and Loops** Decision making within a program, conditions, Relational Operators, Logical Connectives, if statement, if-else statement, Loops: while loop, do while, for loop, Nested loops, Infinite loops, Switch statement, Structures Programming.	09	01	10	20
(Marks) **2TH+6PR**	**Arrays & Functions** One-dimensional arrays: Array manipulation; Two-dimensional arrays, Top-down approach of problem-solving, Modular programming and functions, Return Type, Function call, Block structure, Passing arguments to a Function: call by reference; call by value, Recursive Functions, arrays as function arguments.	10	02	10	22
4 **(Marks)** **6TH+3PR**	**Structures** Structure variables, initialization, structure assignment, nested structure, structures and functions, structures and arrays: arrays of Structures, structures containing arrays.	07	01	08	16
	Pointers & File Processing Address operators, pointer type declaration, pointer	06	01	00	07

5 (Marks) 7 TH	Assignment, pointer initialization, pointer arithmetic, functions and pointers, Arrays and Pointers, pointer arrays.				
Total (in Hrs)		**41**	**06**	**28**	**75**

Where,   *L: Lectures*   *T: Tutorials*   *P: Practical*

MODES OF IN-SEMESTER ASSESSMENT :(40 Marks)

- One Internal (TH) Examination-   **10 Marks**
- One Internal (PR) Examination-   **10 Marks**
- Others   -   **20 Marks**
- Quiz
- Seminar presentation
- Assignment

FYUGP

DETAILED SYLLABUS OF 1st SEMESTER

Title of the Course	:	**INTRODUCTION TO PROGRAMMING**
Course Code	:	**CCSC101p**
Nature of the Course	:	**Core**
Total Credits	:	**01**
Distribution of Marks	:	**15**

1	Write a C program to find the factorial of a given number using recursion.
2	Write a C program to check whether a given number is Prime or not.
3	Write a C program to reverse a string without using the `strrev()` function.
4	Write a C program to sort an array of integers in ascending order using the bubble sort algorithm.
5	Write a C program to find the largest and smallest elements in an array.
6	Write a C++ program to calculate the factorial of a number using a `for` loop.
7	Write a C++ program to display the multiplication table of a given number.
8	Write a C++ program to reverse a given integer number.
9	Write a C++ program to find whether a given number is a palindrome or not.
10	Write a C++ program to swap two numbers using a temporary variable.

COURSE OUTCOMES

After the completion of this course, the learner will be able to:

CO1:   Write programs using C as a language.
CO2:   Explain the basic terminologies used in computer programming
CO3:   Debug programs in C language.
CO4:   Use different data types in a computer program.
CO5:   Design programs involving decision structures, loops and functions.

SUGGESTED READINGS/ REFERENCES

1. Byron Gottfried "Programming with C"4th edition, Tata Mc Graw-Hill, 2018.

2. E. Balaguruswami, "Programming with ANSI-C"7th Edition, Tata Mc Graw Hill, 2018.

3. Brian W. Kernighan, Dennis M. Ritchie, "The C Programming Language (Ansi C Version) "2ndedition, Pearson Education India, 2015.

4. R.G. Dromey, "How to solve it by Computer", Pearson India, 2007.

Title of the Course : **Introduction to Programming**

Course Code : **CCSC101**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	CO1					
Conceptual Knowledge	CO2	CO1, CO2				CO4, CO5
Procedural Knowledge			CO1	CO3	CO1	CO5
Met cognitive Knowledge						CO1,CO5

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	S	S	S	S	S	S	M	S	L	L	S
CO2	S	M	M	M	M	S	M	S	S	M	M
CO3	S	S	S	S	S	S	M	S	M	M	M
CO4	S	S	S	S	M	S	M	S	M	L	M
CO5	S	S	S	S	S	S	M	S	L	L	S

Title of the Course	:	**FUNDAMENTALS OF COMPUTER SCIENCE**
Course Code	:	**MINCSC101T**
Nature of the Course	:	**Minor**
Total Credits	:	**03**
Distribution of Marks	:	**End-Sem: 45 TH, In-Sem: 30 TH+ 10 PR**

COURSE OBJECTIVES:

- To discuss about basics of computers and their applications.
- To explain fundamental concepts of computer hardware and software.
- To discuss about different types of operating systems and their functions.
- To explore about different computer viruses.
- To familiar with a variety of computer applications, including word processing, spreadsheets, databases.

UNITS	CONTENTS	L	T	P	Total Hours
1 **Marks) 10 TH**	**Introductions computer and information technology:** Introduction to computers–definition, Characteristics, capabilities and limitations, classification of computers, generation of computers.		01	00	09
2 **Marks) 10 TH**	**Computer Organization and working:** Components of a computer system, input devices, output devices, computer memory.	10	01	00	11
3 **Marks) 10 TH**	**Computer software:** Need of software, types of software, system software and application software. Programming languages: machine, assembly, high level, 4GL, their merits and demerits. Application software-word processing, spread sheet, presentation graphics, and database management software.	12	01	00	13
4 **(Marks) 10TH**	**Operating System:** Introduction to Operating Systems (Disk operating system, Windows, Linux, Unix). Introduction to computer virus, Basics of DOS and Unix commands, SHELL	10	01	10	21

	Programming, Basic Windows and Linux Operations.				
(Marks) 5 TH	**MS Office Suite:** Basics of Ms-Word, Ms-Excel, Ms-Power Point and Ms-Access.	10	01	10	21
	Total (in Hrs)	**50**	**05**	**20**	**75**

Where,   ***L: Lectures***   ***T: Tutorials***   ***P: Practicals***

MODES OF IN-SEMESTER ASSESSMENT: (40 Marks)

- One Internal (TH) Examination   -   **10 Marks**
- One Internal (PR) Examination   -   **10 Marks**
- Others   -   **20 Marks**
- Quiz
- Seminar presentation
- Assignment

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DETAILED SYLLABUS OF 1st SEMESTER

Title of the Course	:	**FUNDAMENTALS OF COMPUTER SCIENCE**
Course Code	:	**MINCSC101P**
Nature of the Course	:	**Minor**
Total Credits	:	**01**
Distribution of Marks	:	**15**

1	List and explain the basic components of a computer system (CPU, RAM, HDD, I/O devices). Create a diagram to label each.
2	Prepare a table listing 5 input and 5 output devices with their functions.
3	Create a folder named "Computer_Science", and within it create subfolders like "Theory", "Programs", and "Assignments".
4	Create a text file named `notes.txt`, add 5 lines, rename it to `summary.txt`, and copy it to a new folder.
5	Create a formatted document in MS Word or Google Docs using heading styles, bullet points, tables, and insert an image.
6	Use MS Excel or Google Sheets to create a table of 5 students and calculate total and average marks using formulas.
7	*Demonstrate how to check and troubleshoot internet connectivity or adjust display settings on your computer.*

COURSE OUTCOMES:

After the completion of this course, the learner will be able to:

CO1: Identify computer hardware and peripheral devices.

CO2: Familiar with software applications.

CO3: Understand the risks of different computer viruses.

CO4: Learn different DOS commands and SHELL Programming.

CO5: Apply the basic concepts of a word processing package, electronic spread sheet and PowerPoint tool.

SUGGESTED READINGS/ REFERENCES:

1. Sinha P. K., "Computer Fundamentals", BPB Publication, Sixth Edition, 2012.

2. Rajaraman,V., "Computer Fundamentals*",* PHI, Sixth Edition,2012.

3. Ram. B., "Computer Fundamentals: Architecture and Organization", New Age Publication, 5th Edition, 2013.

4. Goel. A., "Computer Fundamentals", Pearson Education, 2011 Reprint.

5. Sirivastava S.S, "Ms-Office", Laxmi Publication, 2015.

Title of the Course : **FUNDAMENTALS OF COMPUTER SCIENCE**

Course Code : **MINCSC101**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	CO1	CO1				
Conceptual Knowledge		CO2		CO3		
Procedural Knowledge		CO4	CO4, CO5			CO5
Meta cognitive Knowledge						

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	M	M	M	M	M	M	M	M	M	S	S
CO2	M	S	M	M	M	M	S	S	S	S	S
CO3	M	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S

Title of the Course	:	**Basic Concept of Hardware and Software**
Course Code	:	**MDCCSC101T**
Nature of the Course	:	**GENERIC ELECTIVE**
Total Credits	:	**02**
Distribution of Marks	:	**End-Sem: 45TH, In-Sem: 30TH+10PR**

COURSE OBJECTIVES:

- Describe the various components of computer hardware and their functions.
- Explain the functioning of different hardware components with in a computer.
- Assemble and disassemble computer hardware components effectively.
- Test and diagnose computer hardware components using appropriate techniques and tools.
- Use a multi meter to test and troubleshoot computer hardware components.

UNITS	CONTENTS	L	T	P	Total Hours
1 **(Marks)** **10TH+ 2 PR**	**Introduction to computer hardware:** Computer Hardware Overview, Block Diagram Details, Parts of Computer. Motherboard: Types, Block Diagram, Identification of Ports, Chip, Slots, Connector, Section etc. CPU: CPU Socket details, Types of CPU, Identification, Basic Terminology of CPU. RAM: Of RAM, Identification of RAM, RAM Operating Voltage.	05	01	04	10
2 **(Marks)** **8TH+ 4PR**	**SMPS:** Concept of Current, SMPS pin details, SMPS Voltage, Testing of SMPS, How to use Multi meter, Testing of Power Cable.	05	01	04	10
3 **(Marks)** **8TH+ 2PR**	**Hard disk:** Hard disk Types, Identification of Hard disk, Jumper Setting, Warranty, Measuring concept etc.	05	01	06	12
4 **(Marks)** **8TH+ 2PR**	**Computer Organization and working:** Components of a computer system, input devices, output devices, computer memory.	05	01	06	12
5 **(Marks)** **11TH+ 5 PR**	**Computer software:** Need of software, types of software, system software and application software. Programming languages: machine, assembly, high level, 4GL, their merits and demerits. Application software-word processing, spread sheet, presentation graphics, and database management software.	05	01	10	16
	Total (in Hrs)	25	05	30	60

Where,   L: Lectures   T: Tutorials   P: Practicals

MODES OF IN-SEMESTER ASSESSMENT: **(40 Marks)**
- One Internal (TH) Examination   -   **10 Marks**
- One Internal (PR) Examination   -   **10 Marks**
- Others   -   **20 Marks**
- Quiz
- Seminar presentation
- Assignment

FYUGP

DETAILED SYLLABUS OF 1st SEMESTER

Title of the Course	:	**Basic Concept of Hardware and Software**
Course Code	:	**MDCCSC101P**
Nature of the Course	:	**Multi-disciplinary course**
Total Credits	:	**01**
Distribution of Marks	:	**15**

1	List and describe the function of at least 5 hardware components from your computer
2	Create a chart or table that separates 5 input and 5 output devices, with examples and their use.
3	Label and explain the parts of a CPU cabinet using a diagram or during a lab demonstration.
4	Create a table listing 3 system software and 3 application software .
5	Use any installed software (like MS Word or Paint) to create and save a simple document or drawing.
6	Identify system software vs application software on a given PC.
7	Demonstrate a presentation with at least 3 slides including text, images, and transitions.
8	Demonstrate how data flows from input to output through the CPU.
9	Identify the color coding of SMPS wires and corresponding voltage values.
10	Identify types of RAM (DDR3, DDR4, DDR5) and determine their voltage using labels or multimeter.

COURSE OUTCOMES:

After the completion of this course, the learner will be able to:

CO1: Describe the different hardware components of a computer and their functions.
CO2: Identify and differentiate between different types of hardware components.
CO3: Assemble, dissemble, and test a computer system.
CO4: Use a multi meter to test the power supply unit (SMPS) and other hardware components.
CO5: Troubleshoot and repair common hardware issues with keyboard and mouse.

SUGGESTED READINGS/ REFERENCES:

1. Craig Zacker, John Rourke, PC Hardware: The Complete Reference, McGraw Hill Education; 1st edition (1 July 2017)
2. Stephen Bigelow, Troubleshooting, Maintaining& Repairing PCs , McGraw-Hill Education; 5th edition (2015)
3. Prajapat, Rahul. Field Technician-Computing & Peripherals (English Version):Computer Hardware and Maintenance. N.p.: Amazon Digital Services LLC - KDP Print US, 2018.
4. Sinha P. K., "Computer Fundamentals", BPB Publication, Sixth Edition, 2012.
5. Rajaraman,V., "Computer Fundamentals*"*, PHI, Sixth Edition,2012.
6. Ram. B., "Computer Fundamentals: Architecture and Organization", New Age Publication, 5th Edition, 2013.

Title of the Course : **Basic Concept of Hardware and Software**

Course Code : **MDCCSC101**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	CO1	CO1, CO2				
Conceptual Knowledge		CO1, CO2				
Procedural Knowledge		CO3	CO4, CO5			
Met cognitive Knowledge						

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	L	L	M	M	M	M	M	M	M	L	M
CO2	L	M	M	M	M	M	S	S	S	L	M
CO3	S	S	S	S	S	S	S	S	S	L	M
CO4	L	M	M	S	S	M	S	S	S	L	M
CO5	S	S	S	S	S	S	S	S	S	L	M

Title of the Course	:	**Mastering Productivity with Google Workspace**
Course Code	:	**SECCSC101T**
Nature of the Course	:	**Fundamentals of PC**
Software Total Credits	:	**02**
Distribution of Marks	:	**End-Sem: 45TH+15 PR, In-Sem: 30 TH+10PR**

COURSE OBJECTIVES:

- To introduce to the basics of office suite software, such as Microsoft Office
- To develop skills in word processing, including formatting
- To teach how to use basic formulas and functions, macros, and pivot tables in spreadsheets.
- To instruct on creating and delivering effective presentations using presentation tools.

UNITS	CONTENTS	L	T	P	Total Hours
1 (Marks) 8TH	**Introduction to Computer:** Definition of computer, basic components of computer, bus, evolution of computers, Generations of computers, classification of Computers, Memory, Input device, Need of software, types Of software, system software and application software.	05	01	-	10
2 (Marks) 10TH+4PR	**Introduction to office suite**: Introduction to Operating System, Installation and basics of MS office/Libre office, Google Workspace and its uses, Google Forms, Google Docs and Google Sheets	04	01	08	09
3 (Marks) 10TH+4PR	**Word Processing:** Working with Documents-Formatting Documents-Setting Page Style-Creating Tables- Drawing-Tools Printing Documents-Operating with MS-Word documents.	06	01	10	17
4 (Marks) 7TH+4PR	**Spreadsheets:** Worksheets, formatting data, creating charts and graphs, using basic formulas and functions, macros, PivotTable	05	01	06	12
5 (Marks) 10TH+3PR	**Presentation Tools:** Adding and formatting text, pictures, graphic objects, including charts, objects, formatting slides, notes, hand-outs, slide-shows, using transitions, animations	05	01	06	12
	Total (in Hrs)	25	**05**	**30**	**60**

Where,   *L: Lectures*   *T:Tutorials*   *P:Practicals*

MODES OF IN-SEMESTER ASSESSMENT: **(40 Marks)**
- One Internal (TH) Examination   -   1**0 Marks**
- One Internal (PR) Examination   -   **10 Marks**
- Others   -   **20 Marks**
- Quiz
- Seminar presentation
- Assignment

FYUGP

DETAILED SYLLABUS OF 1ˢᵗ SEMESTER

Title of the Course	:	**Mastering Productivity with Google Workspace**
Course Code	:	**SECCSC101P**
Nature of the Course	:	**Skill Enhancement Course**
Total Credits	:	**01**
Distribution of Marks	:	**15**

1	Create a professional document in MS-Word with a title, headings, bullet points, and an image. Share the document with editing access to a classmate.
2	Generate a chart or graph in MS- Excel based on given data
3	Create a Google Form for collecting student feedback with multiple types of questions (MCQ, short answer, scale, etc.). Enable email collection and show a confirmation message.
4	Compose and send an email with a proper subject, body, and attachment. Use CC and BCC appropriately. Create a label and apply it to the email.
5	Using of formula and functions in Ms Excel
6	Prepare a short presentation in Google Slides on any topic of your choice (minimum 4 slides). Add images, transitions, and speaker notes.
7	Create a bar chart or pie chart showing student performance.
8	Set custom page margins and add a header and footer to the document.
9	Create a presentation with at least 5 slides on "Evolution of Computers".
10	Use functions: `SUM()`, `AVERAGE()`, `IF()` to perform calculations.

COURSE OUTCOMES:

After the completion of this course, the learner will be able to:

CO1: Install and configure Microsoft Office and Libre Office software for various tasks.
CO2: Use formatting options, create tables, and employ drawing tools in word
processing documents.
CO3: Develop spreadsheets utilizing basic formula and functions, create macros,
and construct pivot tables to analyze data.
CO4: Design and produce effective presentations by adding and formatting text, pictures,
graphic objects, including charts and objects, and formatting slides, notes, and hand-outs, and
using transitions and animations.
CO5: Implement and utilize cloud-based office automation tools to enhance work efficiency
and collaboration.

SUGGESTED READINGS/REFERENCES:

1. Sushila M, Introduction to Essential tools, JBA, 2009.

2. Wang, W. (2018). Office 2019 For Dummies. United States: Wiley.

3. Kumar, B. (2017). Mastering MS Office. India: V&S Publishers.

4. Kumar A, (2019) Computer Basics with Office Automation, Dream tech Press, ISBN:
   9789389447194, 9789389447194.

Title of the Course : **Fundamentals of PC Software**

Course Code : **SECCSC101**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	CO1	CO1				
Conceptual Knowledge		CO2	CO2, CO3, CO4, CO5			CO2, CO3, CO4, CO5
Procedural Knowledge		CO2	CO2, CO3, CO4, CO5			CO2, CO3, CO4, CO5
Meta cognitive Knowledge						

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	L	L	M	L	L	L	S	L	L	L	S
CO2	S	S	M	L	S	M	S	S	S	S	S
CO3	S	S	M	M	S	M	S	S	S	S	S
CO4	S	S	M	M	S	M	S	S	S	S	S
CO5	S	S	M	M	S	M	S	S	S	S	S

Title of the Course	:	DATA STRUCTURE
Course Code	:	CCSC202T
Nature of the Course	:	Core
Total Credits	:	03
Distribution of Marks	:	End-Sem: 45 TH+15PR, In-Sem: 30TH+10PR

COURSE OBJECTIVES:

- To learn the major algorithms in data structures.
- To analyze the performance of algorithms.
- To explore which algorithm or data structure to use in different scenarios.
- To learn the properties of various data structures such as stacks, queues, lists, and trees.
- To learn and explore various sorting algorithms, including bubble sort, insertion sort, selection sort, heap sort, merge sort, and quick sort.
- To learn various searching algorithms.

UNITS	CONTENTS	L	T	P	Total Hours
1 (Marks) 10TH+6PR	**Introduction & Basic of Data Structure** Data structure, algorithms, Primitive and Composite data types, Time and Space Complexity of Algorithms, Linked List, Stack, Queues implementation using Array and linked list, Insertion, Deletion, and Traversal of linked list. Recursion and its implementation regarding stack.	09	01	10	20
2 (Marks) 10TH+6PR	**Sorting & Searching Algorithms** Introduction to Sorting and its practical use, Sorting Algorithms and its implementation Bubble sort, Insertion sort, Selection Sort, Quick Sort, Merge sort, and Radix Sort. Introduction to Searching algorithms, Linear search, Binary search, depth-first search, and breadth-first search techniques.	09	01	10	20
3 (Marks) 12TH+3PR	**Introduction to Trees** Introduction to Trees, properties of Trees, Binary Tree, Complete Binary Trees, Binary search Trees, Tree traversal methods(pre-order, in order, post order),Infix, Postfix and Prefix Notations, the basic concept of Heap	10	02	8	20

		L	T	P	Total
4 (Marks) 4 TH	**Hashing and Collision** Hash tables, Hash functions, collisions, collision resolution	07	01	00	08
5 (Marks) 9 TH	**File Structure** Concept of Fields, Records and Files, Blocks, Clusters, Sectors. Indexing Structures for Files: Types of Single-level Ordered Indexes, Multilevel Indexes.	06	01	00	07
Total (in Hrs)		**41**	**06**	**28**	**75**

Where,   *L: Lectures*   *T: Tutorials*   *P: Practical*

MODESOF IN-SEMESTER ASSESSMENT: (40 Marks)

- One Internal (TH) Examination   -   **10 Marks**
- One Internal (PR) Examination   -   **10 Marks**

- Others   -   **20 Marks**
- Quiz
- Seminar presentation
- Assignment

DETAILED SYLLABUS OF 2ⁿᵈ SEMESTER

Title of the Course :	**DATA STRUCTURE**
Course Code :	**CCSC202P**
Nature of the Course :	**Core**
Total Credits :	**01**
Distribution of Marks :	**15**

1	Write a C program to insert and delete an element at a specific position in an array.
2	Write a C program to search for a given element in an array using linear search.
3	Write a C program to perform binary search on a sorted array.
4	Write a C program to sort an array using the bubble sort algorithm.
5	Write a C program to implement a stack using an array with push, pop, and display operations.
6	Write a C program to implement a queue using an array with enqueue and dequeue operations.
7	Write a C program to create a singly linked list and display its elements.
8	Write a C program to delete a node from the beginning, end, or a specific position in a singly linked list.
9	Write a C program to implement a stack using a linked list.
10	Write a C program to implement a queue using a linked list.

COURSE OUTCOMES:

After the completion of this course, the learner will be able to:

CO1	Calculate the time and space complexity of algorithms
CO2	Use an array or linked list in different scenarios.
CO3	Differentiate between linear and non-linear data structures.
CO4	Apply non-linear data structure in appropriate areas.
CO5	Explain hashing and collision resolution methods.
CO6	Apply various sorting and searching algorithms to different problems.

SUGGESTED READINGS/ REFERENCES:

1. A. M. Tenenbaum, Y. Langsam, M. J. Augenstein, Data Structure using C, Pearson Education , 1st Edition, 2019.

2. Lipschutz Seymour "Data Structures with C",T.M.Hill,2017.

3. Weiss, Mark Allen, "Data Structures and Algorithm Analysis in C++",Pearson,4thEdition,2013

Title of the Course : **DATA STRUCTURE**

Course Code : **CCSC202**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	CO1			CO3		
Conceptual Knowledge	CO6	CO5	CO1, CO4, CO6	CO3	CO1	CO2, CO4
Procedural Knowledge		CO4, CO6	CO4, CO6		CO1, CO6	CO2, CO4
Meta cognitive Knowledge		CO5	CO1	CO6		

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	S	S	S	S	S	S	S	S	M	M	M
CO2	S	S	S	S	S	M	M	S	M	L	M
CO3	S	S	S	S	S	S	S	S	M	L	M
CO4	S	S	S	S	S	S	S	S	M	L	M
CO5	M	S	S	M	M	M	M	S	M	L	M
CO6	S	S	S	S	S	S	S	S	M	L	M

Title of the Course	:	**CYBER SECURITY**
Course Code	:	**MINCSC202T**
Nature of the Course	:	**Minor**
Total Credits	:	**03**
Distribution of Marks	:	**End-Sem: 45 TH, I n-Sem: 30TH+10PR**

COURSE OBJECTIVES:

- To introduce the concept of cyberspace, Internet governance, and cyber security issues and challenges.
- To familiarize with different types of cybercrimes, modus operandi of cyber criminals, and legal perspective of cybercrime.
- To enable to understand social media platforms, their challenges, opportunities, and pitfalls, and the security issues related to social media.
- To provide with an understanding of e-commerce and digital payments, their components, threats, and security best practices.
- To introduce to digital device security, password policy, security patches management, and Wi-Fi securityandtofamiliarizewithdifferenttoolsandtechnologiesforcybersecurity.

UNITS	CONTENTS	L	T	P	Total Hours
1 (Marks) 10TH	**Introduction to Cyber security:** Defining Cyberspace and Overview of Computer and Web-technology, Architecture of cyberspace, Communication and web technology, Internet, World wide web, Advent of internet, Internet infrastructure for data transfer and governance, Internet society, Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security.	06	01	-	07
2 (Marks) 10TH	**Cybercrime and Cyber law**: Classification of cybercrimes, Common cybercrimes-Cybercrime targeting computers and mobiles, cyber crime against women and children, financial frauds, social engineering attacks, malware and ransom ware attacks, zero day and zero click attacks, Cybercriminals modus-operandi, Reporting of cybercrimes, Remedial and mitigation measures, Legal perspective of cyber Crime, IT Act 2000 and its amendments, Cyber crime and offences, Organizations dealing with Cybercrime and Cyber security in India.	07	01	-	08
3 (Marks) 10TH	**Social Media Overview and Security:** Introduction to Social networks. Types of Social media, Social media platforms, social media monitoring, Hash tag, Viral content, social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging and reporting of in appropriate content, Laws regarding	09	01	10	20

	Posting of inappropriate content, Best practices for the use of Social media.				
4 **(Marks)** **08TH**	**Commerce and Digital Payments** Definition of E- Commerce, Main components of E-Commerce, Elements of E-Commerce security, E-Commerce threats, E-Commerce security best practices, Introduction to digital payments, Components of digital payment and stake holders, Modes of digital payments- Banking Cards, Unified Payment Interface (UPI), e-Wallets, Unstructured Supplementary Service Data (USSD), Aadhar enabled Payments, Digital payments related common fraud sand preventive measures. RBI guidelines on digital Payments and customer protection in unauthorized banking transactions. Relevant provisions of Payment Settlement Act,2007	09	01	10	20
5 **(Marks)** **07TH**	**Digital Devices Security, Tools and Technologies for Cyber Security:** End Point device and Mobile phone security, Password policy, Security patch management, Data backup, Downloading and management of third party software, Device security policy, Cyber Security best practices, Significance of host fire wall and Ant-virus, Management of host firewall and Anti-virus, Wi-Fi security, Configuration of basic security policy and permissions.	09	01	10	20
	Total (in hours)	40	05	30	75

Where,   *L: Lectures*   *T: Tutorials*   *P: Practical*

MODESOF IN-SEMESTER ASSESSMENT :(40 Marks)

- One Internal (TH) Examination   -   **10 Marks**
- One Internal (PR) Examination   -   **10 Marks**
- Others   -   **20 Marks**
- Quiz
- Seminar presentation
- Assignment

DETAILED SYLLABUS OF 2ND SEMESTER

Title of the Course	: **CYBER SECURITY**
Course Code	: **MINCSC202P**
Nature of the Course	: **Minor**
Total Credits	: **01**
Distribution of Marks	: **15**

1	Use an online password generator to create a strong password. Explain why it is considered secure.
2	Analyze a sample phishing email and list all the signs that indicate it is suspicious.
3	Install a password manager (like Bitwarden or LastPass), create a vault, and add at least three accounts securely.
4	Enable and customize the Windows Firewall or Linux UFW to block specific ports or applications.
5	Choose a real cybercrime case (like the Aadhaar data leak, ransomware attacks in India) and prepare a report on what laws were violated and what actions were taken.
6	Simulate the process of reporting a cybercrime using the National Cyber Crime Reporting Portal. (Only navigate and document, do not submit fake reports.)
7	Create a table summarizing key sections of the IT Act 2000 (like Sections 43, 66, 67) and the types of offences they cover.
8	Prepare a one-page safety guide with do's and don'ts for safe social media usage.
9	Watch simulated videos of social engineering attacks (YouTube or Google) and write how attackers manipulate users on social media.
10	Use tools like Wix**,** Shopify**,** or basic HTML/CSS to create a simple online store with product listings, cart, and checkout page.
11	What role do host firewalls and antivirus software play?

COURSE OUTCOMES:

After the completion of this course, the learner will be able to:

CO1: Understand the architecture of cyberspace, communication and web technology, internet infrastructure for data transfer and governance, and internet society.

CO2: Identify the different types of cyber crimes, their modus operandi, reporting and remedial measures, and the legal perspective of cyber crime in India.

CO3: Analyze social media platforms, their challenges, opportunities, and pitfalls, and the security issues related to social media.

CO4: Describe the different components of e-commerce and digital payments, their threats, and security best practices.

CO5: Apply digital device security, password policy, security patch management, and Wi-Fi security best practices.

CO6: Use different tools and technologies for cyber security, such as host firewall, antivirus, and data backup.

SUGGESTED READINGS/ REFERENCES:

1. Cyber Crime Impact in the New Millennium, by R. C Mishra, Auther Press.Edition2010.

2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)

3. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson,13thNovember, 2001)

4. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.

Title of the Course : **CYBER SECURITY**

Course Code : **MINCSC202**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge						
Conceptual Knowledge		CO1, CO2	CO2	CO2	CO4	
Procedural Knowledge			CO3	CO5		
Meta cognitive Knowledge					CO5	

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	L	M	M	M	S	L	M	S	S	S	S
CO2	M	M	S	M	S	M	S	M	S	S	S
CO3	L	M	M	M	M	M	S	S	S	S	S
CO4	S	S	S	S	S	M	S	S	S	S	S
CO5	S	S	M	S	M	M	L	L	L	L	S

Title of the Course	:	**Office Automation Tools**
Course Code	:	MDCCSC202T
Nature of the Course	:	**Multi-disciplinary Course**
Total Credits	:	**02**
Distribution of Marks	:	**End-Sem: 45TH, In-Sem: 30TH+10PR**

COURSE OBJECTIVES:

- Install and configure office suites software such as Microsoft Office and Libre Office for various tasks.
- Format documents, create tables, and use drawing tools to develop advanced word processing skills.
- Utilize basic formulas and functions, create macros, and construct pivot tables in spreadsheets for data analysis.
- Design and deliver effective presentations by adding and formatting text, pictures, graphic objects, charts, and using transitions and animations.
- Explain the benefits and use of cloud office automation tools, specificallyOffice365,in enhancing work efficiency.

UNITS	CONTENTS	L	T	P	Total Hours
1 (Marks) 5TH+3PR	**Introduction to office suite:** Installation and basics of MS office/Libre office	04	01	04	09
2 (Marks) 12TH+3PR	**Word Processing:** Working with Documents- Formatting Documents – Setting Page style- Creating Tables- Drawing- Tools- Printing Documents - Operating with MS Word documents.	06	01	04	11
3 (Marks) 12TH+3PR	**Spreadsheets:** Worksheets, Formatting data, creating charts and graphs, using basic formulas and functions, macros, Pivot Table	05	01	06	12
4 (Marks) 11TH+3PR	**Presentation Tools:** Adding and formatting text, pictures, graphic objects, including charts, objects, formatting slides, notes, hand-outs, slide shows, using transitions, animations	05	01	06	12
5 (Marks) 5TH+3PR	**Cloud:** Introduction to cloud office automation using office-365.	05	01	10	16
	Total (in Hrs)	**25**	**05**	**30**	**60**

Where,   L: Lectures   T: Tutorials   P: Practicals

MODESOFIN-SEMESTERASSESSMENT: (40Marks)
- One Internal (TH) Examination   -   **10Marks**
- One Internal (PR) Examination   -   **10Marks**
- Others   -   **20Marks**
- Quiz
- Seminar presentation
- Assignment

DETAILED SYLLABUS OF 2ND SEMESTER

Title of the Course	:	**Office Automation Tools**
Course Code	:	**MDCCSC202P**
Nature of the Course	:	**Multi-disciplinary Course**
Total Credits	:	**01**
Distribution of Marks	:	**15**

1	Create a formatted resume in MS Word using headings, bullet points, tables, and insert your picture.
2	Create a table listing 5 students with their names, roll numbers, and marks. Apply borders, shading, and sorting.
3	Prepare a monthly budget with columns: Item, Planned Amount, Spent Amount, and Difference. Use formulas and conditional formatting.
4	Create a marks sheet for 5 students in 5 subjects. Calculate total, average, and grade using IF function.
5	Design a 5-slide presentation on "Digital India" using slide transitions, animations, and multimedia
6	Use MS Word and Excel to send personalized invitation letters using Mail Merge.
7	Create a one-page document about "Cyber Security Awareness". Format text with different font styles, sizes, alignment**,** and use headers and footers**.**
8	Create a pivot table from a data set (e.g., sales data with date, item, quantity, price). Summarize total sales per item.
9	Based on the marks sheet of Sl No 4, create a bar chart and a pie chart.
10	Record a simple macro to format a range of cells (bold + color + border). Use the "View > Macros > Record Macro" feature. Submit macro-enabled file (**.xlsm).**

COURSE OUTCOMES:

After the completion of this course, the learner will be able to:

CO1: InstallandconfigureMicrosoftOfficeandLibreOfficesoftwareforvarioustasks.
CO2: Use formatting options, create tables, and employ drawing tools in word processing documents.
CO3: Develop spreadsheets utilizing basic formulas and functions, create macros, and construct pivot tables to analyze data.
CO4: Design and produce effective presentations by adding and formatting text, pictures, graphicobjects,includingchartsandobjects,andformattingslides, notes, and hand-outs, and using transitions and animations.
CO5: Implement and utilize cloud-based office automation tools to enhance work efficiency and collaboration.

SUGGESTED READINGS:

1.   Sushila M, Introduction to Essential tools, JBA, 2009.

2.   Wang, W. (2018). Office 2019ForDummies. United States: Wiley.

3.   Kumar, B. (2017). Mastering MSOffice. India: V&S Publishers.

4.   Kumar A, (2019) Computer Basics with Office Automation, Dream tech Press

Title of the Course : **OFFICE AUTOMATION TOOLS**
Course Code : **MDCCSC202**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge		CO1				
Conceptual Knowledge		CO1	CO2			
Procedural Knowledge			CO2, CO5	CO3		CO3, CO4
Meta cognitive Knowledge			CO5	CO3		CO3, CO4

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	S	L	M	L	L	L	L	M	M	M	L
CO2	S	L	S	L	L	L	M	M	S	M	L
CO3	S	L	S	L	L	L	M	M	S	M	L
CO4	S	L	S	L	L	L	M	M	S	M	L
CO5	S	L	M	L	L	L	M	M	S	M	L

Title of the Course	:	**HTML and CMS Tools**
Course Code	:	**SECCSC202T**
Nature of the Course	:	**SKILL ENHANCEMENT COURSE**
Total Credits	:	**02**
Distribution of Marks:		**End- Sem: 45TH, In-Sem: 30TH+10PR**

COURSEOBJECTIVES:

- Describe the history and foundational concepts of HTML.
- Write HTML code and display web pages in a browser.
- Utilize HTML tags and attributes effectively to structure content.
- Format web pages using basic HTML tags, formatting tags and color coding.
- Explain the use of HTML lists, images, hyperlinks, tables, forms, and headers.
- Identify and describe the functionalities of popular CMS tools such as Word Press , Drupal, and Joomla.

UNITS	CONTENTS	L	T	P	Total Hours
1 **(Marks)** **8TH+3PR**	**Introduction:** History of HTML, Software required for writing HTML code and viewing HTML webpage, HTML Tags and Attributes: HTML Tag vs. Element, HTML Attributes	04	01	04	09
2 **(Marks)** **10TH+3PR**	**HTML-Basic Formatting Tags:** HTML Basic Tags, HTML Formatting Tags, HTML Color Coding, HTML-Grouping Using Div Span, Div And Span Tags for Grouping	05	01	04	10
3 **(Marks)** **10TH+3PR**	**HTML-Lists:** Unordered Lists, Ordered Lists, Definition list **HTML-Images:** Image and Image Mapping **HTML-Hyperlink:** URL-Uniform Resource Locator, URL Encoding	05	01	06	12
4 **(Marks)** **7TH+3PR**	**HTML-Table:** \<table>,\<th>,\<tr>,\<td>,\<caption> ,\<thead>, \<tbody>,\<tfoot>,\<colgroup>,\<col> **HTML-Form:** \<input>,\<textarea>,\<button>,\<select>,\<label> **HTML-Headers:** Title, Base, Link, Styles, Script, Meta	05	01	06	12
5 **(Marks)** **10TH+3PR**	**CMS TOOLS:** Word press, Drupal, Joomla	06	01	10	17
	Total (in Hrs)	25	**05**	**30**	**60**

Where,   L: Lectures   T: Tutorials   P: Practical

MODESOFIN-SEMESTERASSESSMENT: **(40Marks)**

- One Internal (TH) Examination   -   1**0Marks**
- One Internal (PR) Examination   -   **10Marks**
- Others   -   **20Marks**
- Quiz
- Seminar presentation
- Assignment

FYUGP

DETAILED SYLLABUS OF 2ND SEMESTER

Title of the Course	:	**HTML and CMS Tools**
Course Code	:	**SECCSC202P**
Nature of the Course	:	**Skill Enhancement Course**
Total Credits	:	**01**
Distribution of Marks	:	**15**

1	Write an HTML page with a title, headings (h1 to h3), a paragraph, and an image.
2	Use the `<table>` tag to display student names, roll numbers, and marks. Add borders and background color.
3	Create a webpage with an ordered list, unordered list, and at least two hyperlinks to other websites.
4	Design a form with fields: Name, Email, Gender (radio buttons), Courses (checkboxes), and a Submit button.
5	Style your HTML elements using inline CSS: change font, color, background, and text alignment.
6	Create a simple HTML webpage that displays your name, class, and college using basic HTML tags like `<html>`, `<head>`, `<title>`, and `<body>`.
7	Design a webpage with two sections using `<div>` for layout and `<span>` to color specific text inside a paragraph.
8	Insert an image using the `<img>` tag and create a basic **image map** with clickable areas.
9	Create a feedback form with: • Text field, textarea, dropdown, radio buttons, checkboxes • A submit and reset button • Use `<input>`, `<textarea>`, `<select>`, `<label>`, `<button>`
10	Install WordPress on localhost (using XAMPP or WAMP).

COURSE OUTCOMES:

After the completion of this course, the learner will be able to:

CO1: Illustrate the history and importance of HTML.

CO2: Write HTML code and view HTML web pages using appropriate software.

CO3: Use HTML tags and attributes to create effective web pages.

CO4: Format web pages using basic HTML tags, formatting tags, and color coding.

CO5:   Use HTML lists, Images, hyperlinks, tables, forms, and headers to enhance their web pages.

SUGGESTED READINGS/REFERENCES:

1. Huddleston, R. (2018), Introduction to HTML and CSS--O'Reilly.
2. Jon Duckett (2019), HTML and CSS, John Wiely.
3. Minnick , J. (2015).WebDesignwithHTML5andCSS3(8thEdition). Cengage Learning.
4. James P.(2011), Professional Mobile Web Development with Word Press, Joomla! and Drupal, Wiley Publications, ISBN: 978-0-470-88951-0.

Title of the Course : **HTML AND CMS TOOLS**

Course Code : **SECCSC202**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	CO1	CO1				
Conceptual Knowledge		CO2	CO2,CO3, CO4, CO5			CO2, CO3, CO4, CO5
Procedural Knowledge		CO2	CO2,CO3, CO4, CO5			CO2, CO3, CO4, CO5
Meta cognitive Knowledge						

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	L	L	M	L	L	L	S	L	L	L	S
CO2	S	S	M	L	S	M	S	S	S	S	S
CO3	S	S	M	M	S	M	S	S	S	S	S
CO4	S	S	M	M	S	M	S	S	S	S	S
CO5	S	S	M	M	S	M	S	S	S	S	S

Title of the Course	:	**DATABASE MANAGEMENT SYSTEM**
Course Code	:	**CCSC303T**
Nature of the Course	:	**Core**
Total Credits	:	**03**
Distribution of Marks	:	**End-Sem: 45 TH, In-Sem: 30TH+10PR**

COURSE OBJECTIVES:

- To learn Database Management Systems and their characteristics.
- To explore the concept to Conceptual Data Modeling using Entities and Relationships.
- To learn the Relational Model and its concepts, constraints, and update operations.
- To learn Database design techniques using ER and EER for relational mapping, functional dependencies, and normal forms.
- To familiarize with SQL and its data definition, constraints, retrieval queries, and data manipulation statements.

UNITS	CONTENTS	L	T	P	Total Hours
1 (Marks) 5 TH	**Introduction to Database Management Systems** Characteristics of database approach, data models, DBMS. Architecture and data independence. Advantages of using the DBMS approach.	08	02	00	10
2 (Marks) 8TH	**Conceptual Data Modeling using Entities and Relationships** Entity types, Entity sets, attributes, roles, and structural constraints, Weak entity types, ER diagrams, examples, Specialization and Generalization.	12	04	00	16
3 (Marks) 10TH	**Relational Model** Relational Model Concepts, Relational Model Constraints and relational database schemas, Update operations, transactions, and dealing with constraint Violations.	10	05	00	15
4 (Marks) 10TH	**Database design** ER and EER to relational mapping, functional dependencies, normal forms up to third normal form	08	01	06	15
5 (Marks) 12TH	**SQL** SQL data definition and data types, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL, Additional Features of SQL.	08	01	10	19
	Total (in Hrs)	46	13	16	75

Where,   L: Lectures   T: Tutorials   P: Practical

- One Internal (TH) Examination   -   **10 Marks**
- One Internal (PR) Examination   -   **10 Marks**

- Others   -   **20 Marks**
- Quiz
- Seminar presentation
- Assignment

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DETAILED SYLLABUS OF 3rd SEMESTER

Title of the Course	: **DATABASE MANAGEMENT SYSTEM Course**
Code	: **C303**
Nature of the Course	: **Core**
Total Credits	: **01**
Distribution of Marks	: **15**

1	Create a table named Students with fields: Roll_No (INT), Name (VARCHAR), Age (INT), and Marks (FLOAT).
2	Insert at least 5 records into the Students table.
3	Write different queries to display, update, count, like, delete, etc
4	Create two tables: Employees (Emp_ID, Name, Dept_ID) and Departments (Dept_ID, Dept_Name). Write a query to display employee names with their department names.
5	Design an ER diagram for a college database with entities like Student, Course, Faculty, and Enrollment. Include relationships and constraints.
6	Convert the ER model of the college system into relational schema with tables, primary keys, and foreign keys.
7	Create a relational schema in SQL with appropriate constraints like PRIMARY KEY, NOT NULL, UNIQUE, and FOREIGN KEY.
8	Given a table with repeating groups and redundancy, normalize it up to Third Normal Form (3NF)**.**
9	Given a set of attributes and functional dependencies, identify candidate keys and check if the relation is in 2NF/3NF.
10	List 5 key differences between traditional file systems and DBMS.

COURSE OUTCOMES:

After the completion of this course, the learner will be able to:

CO1: Understand the characteristics of Database Management Systems and the advantages of using the DBMS approach.

CO2: Create Conceptual Data Models using Entities and Relationships, including entity types, entity sets, attributes, and roles.

CO3: Understand the Relational Model and its concepts, constraints, and update operations.

CO4: Design databases using ER and EER for relational mapping, functional dependencies, and normal forms up to the third normal form.

CO5: Write SQL statements for data definition, specifying constraints, retrieval queries, and data manipulation statements like INSERT, DELETE, and UPDATE.

SUGGESTED READINGS/R EFERENCES:

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2016.

2. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd McGraw Hill,2018

3. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, Mc Graw Hill, 2019.

4. H.G. Molina, J. Ullman, J. Widom, Database Systems: The Complete Book, Pearson, 2nd edition, 2008.

Title of the Course : **DATABASE MANAGEMENT SYSTEM**
Course Code : **CCSC303**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	CO2, CO5	CO1, CO3	CO4	CO5		CO2, CO4
Conceptual Knowledge		CO1, CO3	CO2, CO4, CO5	CO2, CO4, CO5	CO2, CO4, CO5	CO2, CO4, CO5
Procedural Knowledge	CO4		CO2, CO4, CO5	CO2, CO4	CO4, CO5	CO2, CO4, CO5
Met cognitive Knowledge		CO1, CO3	CO5		CO5	CO2, CO4

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	S	S	M	S	S	S	M	S	M	M	M
CO2	S	S	S	S	S	S	S	S	M	M	M
CO3	S	S	M	S	S	S	M	S	M	M	M
CO4	S	S	S	S	S	S	S	S	M	M	M
CO5	S	S	M	S	S	S	M	S	M	M	M

Title of the course	: **OBJECT ORIENTED PROGRAMMING USING C++**	
Course code	: **CCSC304T**	
Nature of the course	: **Core**	
Total credits	: **03**	
Distribution of Marks	: **End Sem: 45 TH+15 PR, In-Sem: 30 TH+10 PR**	

COURSE OBJECTIVES:

- To introduce Object Oriented Programming concepts using the C++ language.
- To explain templates and exception handling
- To describe the principles of inheritance
- To use virtual functions and polymorphism
- To design problem-solving codes using the object-oriented approach through C++.

UNITS	CONTENTS	L	T	P	Total Hours
1 (Marks) 8 TH + 01PR	**Fundamentals of C++:** Introduction to object oriented programming, user defined types, polymorphism, and encapsulation. Getting started with C++- syntax, data-type, variables, strings, functions, exceptions and statements, Namespaces and exceptions, operators. Flow control, Functions, recursion. Arrays and pointers, structures.	07	01	00	08
2 (Marks) 10 TH + 05PR	**Classes, objects and Operator overloading:** C++ extension to structures, member access operators static members, array of objects, returning objects From functions, Friend functions, pointers to members, friend classes, stack class, Default constructors, overloaded constructors, constructors with default arguments, copy constructors, dynamic constructor, destructor Defining operator over loading, operator function as Member function and friend function, overloading Unary and binary operators, type conversions, function Overloading	08	01	06	15
3 (Marks) 10TH + 04PR	**Templates and Exception Handling:** String template, instantiation, template parameters Type checking, function template, template argument deduction, specifying template arguments, function Template overloading, default template arguments, Specialization, conversions. Error handling, grouping of exceptions, catching exceptions, catchall, re-throw, resource management, autoptr, exceptions and new, resource exhaustion, Exceptions in constructors, exception in destructors, Uncaught exceptions, standard exceptions.	09	01	10	20
4 (Marks)	**Inheritance, virtual Functions and Polymorphism:** Types of inheritance, Defining derived class, Access specifies, public and private inheritance, accessing	09	01	10	20

10TH + 04PR	Base class members, ambiguity in multiple inheritance, virtual base classes, abstract classes, Derived class constructor with arguments, Initialization lists in constructors, classes with in classes.				
5 (Marks) 07TH + 01PR	**File handling:** Basics of file handling in C++, classes for stream operations, operation on files, file opening modes, file Pointer, error handling during files operations.	06	01	05	12
	Total (in Hrs)	**40**	**05**	**30**	**75**

Where,   L: Lectures   T: Tutorials   P: Practicals

MODES OF IN-SEMESTER ASSESSMENT: (40 Marks)

- One Internal (Theory) Examination-   **10 Marks**
- One Internal (Theory) Examination-   **10 Marks**
- Others (Anyone)   -   2**0 Marks**
- Quiz
- Seminar presentation
- Assignment

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DETAILED SYLLABUS OF 3rd SEMESTER

Title of the Course	:	**OBJECT ORIENTED PROGRAMMING USING C++**
Course Code	:	**C304**
Nature of the Course	:	**Core**
Total Credits	:	**01**
Distribution of Marks	:	**15**

1	**Create a class** `Student` **with data members: name, roll number, and marks.** *Write a program to input and display details of 5 students using an array of objects.*
2	**Write a C++ program to implement a class** `Rectangle`**.** *Include member functions to calculate area and perimeter.*
3	Write a program to demonstrate the use of constructors and destructors in a class `Book`.
4	Create a program that uses constructor overloading in a class `Time`
5	Create a base class `Person` and a derived class `Employee`. Display employee details using base class members.
6	Write a program to demonstrate function overloading
7	Create a class `Bank_Account` with private data members and public methods to deposit, withdraw, and display balance.

COURSE OUTCOMES:

After the completion of this course, the learner will be able to:

CO1: Explain Object Oriented Programming concepts using the C++ language CO2: Contrast object oriented programming with procedure based programming

CO3: Use templates to write generic programs

CO4: Design problem solving codes using virtual functions and polymorphism CO5: Construct C++ program to solve real life problems

SUGGESTED READINGS/ REFERENCES:

1. Herbert, S.,'C++: the Complete Reference', 4th edition, Mc Graw Hill Education,2017.
2. Kanetkar Y., 'Let Us C++',BPB Publications; 14th edition, 2016
3. Thareja R.,'Object Oriented Programming with C++', Oxford University Press, 2015.
4. Balagurusamy, E. 'Object Oriented Programming with C++',McGraw Hill Education, 6th Edition, 2013.

Title of the course : OBJECT ORIENTED PROGRAMMING USING C++
Course code : CCSC304

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge		CO1				
Conceptual Knowledge		CO1		CO1, CO2		
Procedural Knowledge		CO1, CO2	CO3	CO1, CO2		CO4, CO5
Met cognitive Knowledge						CO4, CO5

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	L	L	S	S	S	M	M	M	L	M	M
CO2	M	M	M	M	L	L	M	L	L	M	L
CO3	S	S	M	S	M	M	M	M	L	M	S
CO4	S	S	M	S	M	M	L	S	L	M	S
CO5	S	S	S	S	M	M	L	S	L	M	S

Title of the Course : **Introduction to DBMS**

Course Code : **MINCSC303T**

Nature of the Course : **Minor**

Total Credits : **03**

Distribution of Marks : **End-Sem: 45 TH+15PR, In-Sem: 30TH+10PR**

COURSE OBJECTIVES:

- To learn Database Management Systems and their characteristics.
- To explore the concept to Conceptual Data Modeling using Entities and Relationships.
- To learn the Relational Model and its concepts, constraints, and update operations.
- To learn Database design techniques using ER and EER for relational mapping, functional dependencies, and normal forms.
- To familiarize with SQL and its data definition, constraints, retrieval queries, and data manipulation statements.

UNITS	CONTENTS	L	T	P	Total Hours
1 (Marks) 5 TH	**Introduction to Database Management Systems** Characteristics of database approach, data models, DBMS architecture and data independence. Advantages of using the DBMS approach.	08	02	00	10
2 (Marks) 8TH	**Conceptual Data Modeling using Entities and Relationships** Entity types, Entity sets, attributes, roles, and structural constraints, Weak entity types, ER diagrams, examples, Specialization and Generalization.	12	04	00	16
3 (Marks) 10TH	**Relational Model** Relational Model Concepts, Relational Model Constraints and relational database schemas, Update operations, transactions, and dealing with constraint Violations.	10	05	00	15
4 (Marks) 10TH	**Database design** ER and EER to relational mapping, functional dependencies, normal forms up to third normal form	08	01	06	15
5 (Marks) 12TH	**SQL** SQL data definition and data types, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL, Additional Features of SQL.	08	01	10	19
	Total (in Hrs)	46	13	16	75

Where,   L: Lectures   T: Tutorials   P: Practical

MODES OFIN-SEMESTER ASSESSMENT: **(40 Marks)**
- One Internal (TH) Examination   -   **10 Marks**
- One Internal (PR) Examination   -   **10 Marks**

- Others   -   **20 Marks**
- Quiz
- Seminar presentation
- Assignment

FYUGP

DETAILED SYLLABUS OF 3RD SEMESTER

Title of the Course	:	**Introduction to DBMS**
Course Code	:	**MINCSC303P**
Nature of the Course	:	**Core**
Total Credits	:	**01**
Distribution of Marks	:	**15**

1	Create a table named `Students` with fields: Roll_No (INT), Name (VARCHAR), Age (INT), and Marks (FLOAT).
2	Insert at least 5 records into the `Students` table.
3	Write different queries to display, update, count, like, delete, etc
4	Create two tables: `Employees` (Emp_ID, Name, Dept_ID) and `Departments` (Dept_ID, Dept_Name). Write a query to display employee names with their department names.
5	Design an ER diagram for a college database with entities like `Student`, `Course`, `Faculty`, and `Enrollment`. Include relationships and constraints.
6	Convert the ER model of the college system into relational schema with tables, primary keys, and foreign keys.
7	Create a relational schema in SQL with appropriate constraints like PRIMARY KEY, NOT NULL, UNIQUE, and FOREIGN KEY.
8	Given a table with repeating groups and redundancy, normalize it up to Third Normal Form (3NF)**.**
9	Given a set of attributes and functional dependencies, identify candidate keys and check if the relation is in 2NF/3NF.

COURSE OUTCOMES:

After the completion of this course, the learner will be able to:

CO1: Understand the characteristics of Database Management Systems and the advantages of using the DBMS approach.

CO2: Create Conceptual Data Models using Entities and Relationships, including entity types, entity sets, attributes, and roles.

CO3: Understand the Relational Model and its concepts, constraints, and update operations.

CO4: Design databases using ER and EER for relational mapping, functional dependencies, and normal forms up to the third normal form.

CO5: Write SQL statements for data definition, specifying constraints, retrieval queries, and data manipulation statements like INSERT, DELETE, and UPDATE.

SUGGESTED READINGS/R EFERENCES:

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2016.

2. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd McGraw Hill,2018

3. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, Mc Graw Hill, 2019.

4. H.G. Molina, J. Ullman, J. Widom, Database Systems: The Complete Book, Pearson, 2nd edition, 2008.

Title of the Course : **DATABASE MANAGEMENT**
SYSTEM Course Code : **MINCSC303**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	CO2, CO5	CO1, CO3	CO4	CO5		CO2, CO4
Conceptual Knowledge		CO1, CO3	CO2,CO4,CO5	CO2,CO4, CO5	CO2,CO4, CO5	CO2,CO4, CO5
Procedural Knowledge	CO4		CO2,CO4,CO5	CO2, CO4	CO4, CO5	CO2,CO4, CO5
Met cognitive Knowledge		CO1, CO3	CO5		CO5	CO2, CO4

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	S	S	M	S	S	S	M	S	M	M	M
CO2	S	S	S	S	S	S	S	S	M	M	M
CO3	S	S	M	S	S	S	M	S	M	M	M
CO4	S	S	S	S	S	S	S	S	M	M	M
CO5	S	S	M	S	S	S	M	S	M	M	M

Title of the Course	:	**Basics of AI**
Course Code	:	**MDCCSC303T**
Nature of the Course	:	**Multi-disciplinary**
course Total Credits	:	**02**
Distribution of Marks	:	**End Sem: 45TH+15 PR, In-Sem: 30TH+10PR**

COURSEOBJECTIVES:

- To introduce the Photoshop interface and tools.

- To familiarize with importing and saving files in Photoshop.

- To provide an understanding of layers, masks, and selections in Photoshop.

- To introduce the basic retouching tools in Photoshop.

- To provide an understanding of color correction tools and text in Photoshop.

Units	Contents	L	T	P	Total Hours
Unit 1	**AI Ethics and Responsible Use**: Understanding AI and its societal impact, Bias in AI and fairness, Privacy concerns, Ethical AI development and usage, Global AI regulations and frameworks (e.g., EU AI Act, UNESCO recommendations)	5	1	—	**6**
Unit 2	**Introduction to Generative AI**: What is Generative AI? Overview of tools (ChatGPT, DALL·E, Bard, Gemini, etc.) Text generation, image generation, audio synthesis Deep fakes and ethical considerations	6	1	5	**12**
Unit 3	**Effective AI Prompting**: What is a prompt? Prompt engineering basics, Role-based prompting and formatting Few-shot prompting and chain-of-thought prompting, Designing prompts for text, image, and code generation	6	1	6	**13**
Unit 4	**AI Tools for Productivity**: Using AI in Google Workspace and Microsoft 365 (e.g., Smart Compose, Copilot), Meeting summarization tools (Otter.ai, Fireflies.ai), Writing and grammar checkers (Grammarly, Quillbot), Task automation tools (Zapier, Notion AI)	5	1	5	**11**
Unit 5	**Hands-on Applications of AI Tools**• Creating presentations using AI, AI in education: lesson planning, quiz creation, AI-assisted research: summarizing articles, extracting data, Capstone mini-project: Use of AI tools for a real-world task	5	1	12	**18**
	Total (in Hrs)	27	05	28	**60**

Where,   L: Lectures   T: Tutorials   P: Practicals

MODES OF IN-SEMESTER ASSESSMENT: (40 Marks)
- One Internal (TH) Examination   -   **10 Marks**
- One Internal (PR) Examination   -   **10 Marks**
- Others   -   **20 Marks**
- Quiz
- Seminar presentation
- Assignment

FYUGP

DETAILED SYLLABUS OF 3rd SEMESTER

Title of the Course	:	**Basics of AI**
Course Code	:	**MDCCSC303P**
Nature of the Course	:	**Multi-disciplinary Course**
Total Credits	:	**01**
Distribution of Marks	:	**15**

1	Present your findings on how ethical guidelines were violated and suggest improvements.
2	Use ChatGPT (or Gemini/Bard) to generate a short story, poem, or news article. Observe the coherence and factual accuracy. Discuss the limitations.
3	Write prompts for different tasks (e.g., write a CV, generate a quiz, and summarize an article).
4	Compare the results of zero-shot, one-shot, and few-shot prompting
5	Write an email or a letter and observe how AI assists. Discuss usability and limitations.
6	Use tools like Tome, Canva AI, or Beautiful.ai to generate a 5-slide presentation on a topic of your choice.
7	Use a combination of AI tools to create a blog post, with text and images, on a real-world topic
8	Case Study on Bias in AI: Find and analyze a real-world case where an AI system showed bias
9	Create an image of "A futuristic classroom powered by AI".
10	ChatGPT or Bard with the prompt: "You are a history teacher. Create 5 quiz questions on World War II."

COURSE OUTCOMES:

By the end of this course, students will be able to:

CO1: Explain the fundamental concepts of the Internet and the World Wide Web, and describe the roles of web browsers and developer tools.

CO2: Create structured web pages using basic HTML tags, formatting elements, lists, images, hyperlinks, and grouping tags like <div> and <span>.

CO3: Apply CSS to style HTML elements and enhance the presentation of web content.

CO4: Develop interactive features on web pages using JavaScript, including syntax, variables, control structures (loops and conditionals), and DOM manipulation.

CO5: Demonstrate familiarity with content management systems (CMS) such as WordPress, Drupal, and Joomla for building and managing websites.

Suggested Readings / References

1. Binns, R. (2018). *Fairness in machine learning: Lessons from political philosophy*.
2. O'Neil, C. (2016). *Weapons of math destruction: How big data increases inequality and threatens democracy*. Crown Publishing Group.
3. Russell, S., & Norvig, P. (2020). *Artificial Intelligence: A modern approach* (4th ed.). Pearson.
4. Mollick, E., & Mollick, L. (2023). *The practical guide to AI for educators and students*. Wharton School Press. OpenAI. (2023). *Prompt engineering guide*. OpenAI Documentation.

5. Dwivedi, Y. K., Hughes, D. L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., ... & Williams, M. D. (2021). *Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy*. International Journal of Information Management, 57, 101994.

Title of the Course : **Basics of AI**

Course Code : **MDCCSC303**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge						
Conceptual Knowledge	CO1	CO1, CO2	CO3			
Procedural Knowledge		CO3	CO4, CO5			
Met cognitive Knowledge						

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	M	M	M	M	M	M	M	M	M	M	M
CO2	M	M	M	M	M	M	M	M	M	M	M
CO3	M	M	M	M	M	M	M	M	M	M	M
CO4	S	S	M	S	S	S	M	S	M	M	M
CO5	S	S	M	S	M	S	M	S	M	M	S

Title of the Course	:	DIGITAL FLUENCY
Course Code	:	VACCSC303 (OPTION 1)
Nature of the Course	:	VALUE ADDED
COURSE Total Credits	:	02
Distribution of Marks	:	End-Sem: 20TH+10PR, In-Sem: 10TH+10PR

COURSEOBJECTIVES:

- To introduce the concept to digital fluency and its importance in today's world.

- To provide an understanding of computer basics, including hardware, software, and operating systems.

- To familiarize with internet and web browsing, including search engines, email, and social media.

- To teach about online safety, including cyber security threats, protecting personal information, and safe online behavior.

UNITS	CONTENTS	L	T	P	Total Hours
1 (Marks) 5TH+2PR	**Introduction to Digital Fluency** Understanding digital fluency, Importance of digital fluency, Skills required for digital fluency	02	01	08	11
2 (Marks) 5TH+2PR	**Computer Basics** Introduction to computer hardware and software, Basic computer components and their functions, Basics of Operating system and file management, Internet and Web Browsing.	04	01	08	13
3 (Marks) 10TH+6 PR	**Introduction to the Internet, email and Social Media** Navigating the web, Search engines and search strategies, Creating and managing email accounts, Composing, and sending emails, Email etiquette and best practices, Introduction to social media platforms, Privacy, and security settings, Creating and managing social media accounts, Posting, and sharing content.	06	01	14	21
	Total (in Hrs)	2	03	30	45

Where,   L: Lectures   T: Tutorials   P: Practicals

MODES OF IN-SEMESTER ASSESSMENT: **(20 Marks)**
- One Internal (TH) Examination   -   **5 Marks**
- One Internal (PR) Examination   -   **10 Marks**
- Others   -   **5 Marks**
- Quiz
- Seminar presentation
- Assignment

COURSEOUTCOMES:

After the completion of this course, the learner will be able to:

CO1:   Define digital fluency and identify the skills required to be digitally fluent.

CO2:   Identification of computer hardware and software, including operating systems and file management.

CO3:   Navigate the web, perform effective online searches, and create and manage email accounts.

CO4:   Create and manage social media accounts, understand privacy and security settings, and post and share content.

CO5:   Illustrate online safety and be able to identify and mitigate cyber security risks.

SUGGESTEDREADINGS:

1. Acharya,S.,Chellappan,S.,"BigDataAnalytics",WileyPublications2015.

2. R. Thareja, "Computer Fundamentals and Programming in C,"New Delhi, India: Oxford University Press, 2021.

3. R. P. Jainand S. K. Jain, "Introduction to Information Technology, "New Delhi, India: Firewall Media, 2015.

4. K. D. Tripathi, "Social Media: Concepts, Practices and Trends, "New Delhi, India: PHI Learning Pvt. Ltd., 2020.

5. N .K. Venkateswaran, "Cyber Security and Digital Forensics: A Practical Approach," Boca Raton, FL: CRC Press, 2018.

6. S. Gandhiand R. Sharma, "Digital Privacy and Security, "New Delhi, India: Springer Nature Singapore Pte Ltd, 2021.

Title of the Course : **DIGITAL FLUENCY**
Course Code : **VACCSC303 (OPTION 1)**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	CO1,		CO1, CO2			
Conceptual Knowledge	CO1,	CO4, CO5	CO1, CO2,CO5			
Procedural Knowledge			CO3			CO3, CO4
Met cognitive Knowledge						

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	L	L	M	L	L	L	S	M	L	L	M
CO2	L	L	M	L	L	L	S	M	M	L	M
CO3	S	M	M	M	S	L	S	M	M	S	M
CO4	S	M	M	M	S	L	S	M	M	S	S
CO5	L	L	M	M	S	L	S	M	M	S	M

Title of the Course : **DIGITAL AND TECHNOLOGICAL SOLUTIONS**
Course Code : **VACCSC303 (OPTION 2)**
Nature of the Course : **VALUE ADDED**
COURSE Total Credits : **02**
Distribution of Marks : **End Sem: 20TH+10PR, In-Sem: 10TH+10PR**

COURSE OBJECTIVES:

- To provide advanced digital skills and knowledge.

- To develop critical thinking and problem-solving abilities in the digital realm.

- To prepare leaders in the digital landscape.

- To enhance employability by providing relevant and in-demand digitals kills.

UNITS	CONTENTS	L	T	P	Total Hours
1 (Marks) 5TH +2PR	**Advanced Internet Skills** Advanced search techniques and web development using HTML, CSS, and Java Script, Understanding, and using web APIs, Building a responsive website.	02	01	08	11
2 (Marks) 5TH +2PR	**Digital Media and Content Creation** Advanced photo editing using Photoshop or GIMP, Video and audio editing using Final Cuprous Adobe Premiere Pro, Creating digital content for marketing and branding.	04	01	08	13
3 (Marks) 10TH +6PR	**Cyber security, Digital Privacy and Data Analytic** Advanced encryption techniques for data security, Understanding and mitigating advanced cyber threats, Implementing advanced digital privacy measures. Advanced data analysis using Excel or Tableau, understanding data visualization, and creating Compelling visualizations, analyzing complex datasets to derive insights.	06	01	14	21
	Total (in Hrs)	12	03	30	45

Where, *L: Lectures* *T: Tutorials* *P: Practicals*

MODES OF IN-SEMESTER ASSESSMENT: **(20 Marks)**
- One Internal (TH) Examination   -   **5 Marks**
- One Internal (PR) Examination   -   **10 Marks**
- Others   -   **5 Marks**
- Quiz
- Seminar presentation
- Assignment

COURSEOUTCOMES:

After the completion of this course, the learner will be able to:

CO1:   Utilize advanced search techniques and web development tools to create responsive websites

CO2:   Implement digital media editing including photos, videos, and audio using advanced software

CO3:   Implement advanced cyber security and privacy measures to protect digital assets

CO4:   Analyze complex data sets using Excel or Tableau and create compelling Visualizations

CO5:   Lead digital transformation and drive innovation in organizations

SUGGESTED READINGS/REFERENCES:

1. P. N. Thomas and A. Raghuramaraju, "Digital India: Understanding Information, Communication and Social Change," New Delhi, India: Sage Publications India Pvt Ltd, 2017.

2. R. Thareja, "Computer Fundamentals and Programming in C, "New Delhi, India: Oxford University Press, 2021.

3. R. P. Jain and S. K. Jain, "Introduction to Information Technology," New Delhi, India: Firewall Media, 2015.

4. K. D. Tripathi, "Social Media: Concepts, Practices and Trends," New Delhi, India: PHI Learning Pvt. Ltd., 2020.

5. N. K. Venkateswaran, "Cyber Security and Digital Forensics: A Practical Approach," Boca Raton, FL: CRC Press, 2018.

6. S. Gandhi and R. Sharma, "Digital Privacy and Security," New Delhi, India: Springer Nature Singapore Pte Ltd, 2021.

Title of the Course : DIGITAL AND TECHNOLOGICAL SOLUTIONS

Course Code : VACCSC303 (OPTION 2)

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge						
Conceptual Knowledge		CO1, CO2	CO3	CO4	CO4	CO5
Procedural Knowledge		CO1, CO2	CO3		CO4	
Met cognitive Knowledge						CO5

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	M	M	S	M	S	L	M	S	S	S	S
CO2	M	M	S	M	S	M	S	M	S	S	S
CO3	L	M	M	M	M	M	S	S	S	S	S
CO4	S	M	M	M	S	S	S	S	M	M	M
CO5	S	S	S	S	S	S	M	S	M	M	S

Title of the Course   :   **Multimedia Applications and Tools**
Course Code   :   **SECCSC303T**
 Nature of the Course   :   **SKILL ENHANCEMENT COURSE**
Total Credits   :   **02**
Distribution of Marks   :   **End- Semester: 45 TH, In-Semester: 30 TH + 10**

PR COURSE OBJECTIVES:

- Identify the various components of multimedia and describe their functions.
- Explain the stages involved in creating multimedia projects.
- Describe the hardware, software, and authoring tools used in multimedia production.
- Use multimedia production tools such as Adobe Premiere Pro, Da Vinci Resolve, and Photoshop to create and edit multimedia content.
- Evaluate different multimedia production tools and techniques to determine their effectiveness for various projects.

UNITS	CONTENTS	L	T	P	Total Hours
1 **(Marks)** **10TH** **+3PR**	**Multimedia:** Introduction to multimedia, Components, Uses of multimedia. **Making Multimedia:** Stages of a multimedia project, Requirements to make good multimedia, Multimedia Hardware-Macintosh and Windows production Platforms, Hardware peripherals - Connections, Memory and storage devices, Multimedia software and Authoring tools.	05	01	05	11
2 **(Marks)** **10TH** **+3PR**	**Text:** Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools, Hypermedia & Hypertext **Images:** Still Images–Bitmaps, Vector Drawing, 3D Drawing & rendering, Natural Light & Colors, Computerized Colors, Color Palettes, Image File Formats.	05	01	05	11
3 **(Marks)** **8TH+3PR**	**Sound:** Digital Audio, MIDI Audio ,MIDI vs Digital Audio, Audio File Formats.	05	01	05	11
4 **(Marks)** **7TH+3PR**	**Video:** How Video Works, Analog Video, Digital Video, Video File Formats, Video Shooting and Editing.	05	01	10	16
5 **(Marks)** **10TH+3PR**	**Tools:** Adobe Premier Pro, Da Vinci Resolve, Photoshop.	05	01	05	11
	Total (inHrs)	25	**05**	**30**	**60**

Where,   *L: Lectures*   *T: Tutorials*   *P: Practicals*

MODES OF IN-SEMESTER ASSESSMENT: **(40 Marks)**

- One Internal (TH) Examination   -   **10 Marks**
- One Internal (PR) Examination   -   **10 Marks**
- Others   -   **20 Marks**
- Quiz
- Seminar presentation
- Assignment

FYUGP

DETAILED SYLLABUS OF 3rd SEMESTER

Title of the Course	:	**Multimedia Applications and Tools**
Course Code	:	SECCSC303P
Nature of the Course	:	**Skill Enhancement Course**
Total Credits	:	**01**
Distribution of Marks	:	**15**

1	Use Photoshop to edit a photo by cropping, adjusting brightness/contrast, and applying filters.
2	Design an event poster (e.g., college fest, seminar) using Canva or Adobe Express with text, images, and shapes.
3	Use OpenShot or Shotcut to merge two video clips, trim unwanted parts, and add a fade transition.
4	Create a simple logo for a brand or club using vector design tools like Inkscape or Canva.
5	Use video editing software to insert subtitles to a spoken dialogue or short film clip.
6	Use Photoshop or Canva to create a poster that uses at least three different fonts**.** Apply effects like shadow, glow, spacing, or 3D.
7	Save the same image in JPEG, PNG, BMP, and GIF formats using Photoshop or GIMP**.** Compare file sizes and visual quality.
8	Use **Photoshop** to: • Remove the background from an image • Adjust brightness and contrast

COURSE OUTCOMES:

By the end of this course, students will be able to:

CO1: Explain the basic concepts, components, and applications of multimedia in various domains.

CO2: Describe the stages of multimedia project development and identify the hardware and software requirements for multimedia production.

CO3: Apply principles of typography and hypertext to effectively integrate text into multimedia projects.

CO4: Differentiate between image types (bitmap, vector, 3D), understand color models, and use appropriate image formats for multimedia content.

CO5: Understand the fundamentals of digital and MIDI audio, compare their characteristics, and work with common audio file formats.

CO6: Explain video technologies, including analog and digital video, and perform basic video shooting, editing, and format conversion.

CO7: Use industry-standard multimedia tools such as Adobe Premiere Pro, DaVinci Resolve, and Photoshop for content creation and editing.

Suggested Readings / References

1. **Tay Vaughan**, *Multimedia: Making It Work*, 9th Edition, McGraw-Hill Education.
2. **Ranjan Parekh**, *Principles of Multimedia*, 2nd Edition, Tata McGraw-Hill Education.
3. **Ze-Nian Li and Mark S. Drew**, *Fundamentals of Multimedia*, 2nd Edition, Pearson Education.
4. **Fred Halsall**, *Multimedia Communications: Applications, Networks, Protocols and Standards*, Pearson Education.
5. **Adobe Creative Team**, *Adobe Premiere Pro Classroom in a Book*, Adobe Press.
6. **Maxim Jago**, *Adobe Premiere Pro Classroom in a Book (2020 release)*, Adobe Press.
7. **DaVinci Resolve 18 Beginner's Guide**, Blackmagic Design Official Training Series.
8. **Adobe Creative Team**, *Adobe Photoshop Classroom in a Book*, Adobe Press.
9. **Michael Baumgardt**, *Adobe Photoshop for Beginners*, Peachpit Press.

Title of the Course : **Multimedia Applications and Tools**
Course Code : **SECCSC303**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	CO1, CO2, CO3, CO4, CO5					
Conceptual Knowledge						
Procedural Knowledge	CO1, CO2, CO3.CO4, CO5					CO1, CO2, CO3, CO4, CO5
Met cognitive Knowledge						

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	S	S	M	L	M	M	M	S	S	M	S
CO2	S	S	M	L	M	M	M	S	S	M	S
CO3	S	S	M	L	M	M	M	S	S	M	S
CO4	S	S	M	L	M	M	M	S	S	M	S
CO5	S	S	M	L	M	M	M	S	S	M	S

Title of the Course : NUMERICAL ANALYSIS

Course Code : CCSC405

Nature of the Course : Core

Total Credits :04

Distribution of Marks : End- Sem: 60 TH, In-Sem: 40 TH

COURSE OBJECTIVES:

- Learn to analyze and quantify errors in numerical computations.
- Learn techniques for interpolating data, approximating functions.
- Understand the role of linear algebra in numerical analysis.
- Explore techniques for numerical integration and differentiation.
- Acquire proficiency in applying numerical methods to solve a wide range of problems.

UNITS	CONTENT	L	T	P	Total Hours
1 (12 Marks)	**Solution of Nonlinear Equation** Introduction, Types of equation, Errors in Computing, The Bisection Method, False Position Method, Newton Raphson Method, Solution of system of Nonlinear Equation, Fixed Point Iteration and Convergence.	10	02	-	12
2 (12 Marks)	**Interpolation and Approximation** Introduction, Errors in Polynomial Interpolation, Lagrange's Polynomial, Newton's Interpolation Methods, Least Square Method for Linear and Nonlinear Data	10	02	-	12
3 (12 Marks)	**Numerical Differentiation and Integration** Introduction to Numerical Differentiation, Newton's Differentiation Formula, Numerical Integration(Trapezoidal Rule, Simpson's 1/3 Rule, 3/8 Rule)	08	03	-	11
4 (12 Marks)	**Solution of Linear Algebraic Equations** Review of the Existence of Solutions and Properties of Matrices, Consistency of a Linear System of Equations, Gaussian Elimination Method, Gauss Jordan Method, Inverse of Matrix using Gauss Elimination Method, Iterative Methods (Jacobi and Gauss-Seidel Iteration), Power Method.	10	03	-	13
5 (12 Marks)	**Solution of Ordinary Differential Equations** Introduction to Differential Equation, Initial Value Problem, Taylor's Series Methods, Picard's Method, Euler's Method	10	02	-	12
	Total (in Hrs)	48	12	-	60

Where, L: Lectures T: Tutorials P: Practicals

MODES OF IN-SEMESTER ASSESSMENT: **(40 Marks)**
- Two Internal Examination   -   **20 Marks**
- Others   -   **20 Marks**
- Quiz
- Seminar presentation
- Assignment

COURSEOUTCOMES:

After successful completion of this course, learners will be able to:

CO1: Demonstrate a solid understanding of fundamental numerical methods.

CO2: Identify sources of error in numerical computations and apply strategies to minimize errors effectively.

CO3: Interpret numerical results, drawing meaningful conclusions.

CO4: Analyze numerical solutions critically, evaluating their accuracy, stability for specific problems.

CO5: Solve ordinary differential equations using numerical methods

SUGGESTED READINGS/REFERENCES:

1. Shankar R., "Numerical Methods: Principles, Analysis, and Algorithms", Pearson Education India, 2008.
2. Sastry S.S., "Numerical Analysis", Prentice Hall India Learning, 2011.
3. Burden R. L. and Faires J.D. "Numerical Analysis",Cengage Learning, 2010.
4. Chakra S.C.and Canale R.P.,"Numerical Methods for Engineers", McGraw-Hill Education, 2010.

Title of the Course   **: NUMERICAL ANALYSIS**

Course Code   **: CCSC405**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	CO1	CO1				
Conceptual Knowledge			CO2	CO3		
Procedural Knowledge				CO4	CO5	CO5
Met cognitive Knowledge					CO4	

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	S	M	S	M	S	M	S	S	S	M	M
CO2	S	S	M	M	S	M	S	M	S	M	M
CO3	S	M	S	S	S	M	S	M	M	M	S
CO4	S	S	S	S	S	M	S	S	S	M	S
CO5	M	M	S	S	S	M	S	S	S	M	S

Title of the Course	:	**OPERATING SYSTEM**
Course Code	:	CCSC406T
Nature of the Course	:	Core
Total Credits	:	03
Distribution of Marks	:	**End- Semester: 45 TH, In-Semester: 30 TH + 10 PR**

COURSE OBJECTIVES:

- To introduce the basic concepts, types, functions, general working, and evolution of Operating Systems.
- To explain the process management in Operating Systems and its various components.
- To discuss different scheduling mechanisms and strategies used in Operating Systems.
- To discuss memory management in Operating Systems and its various techniques.
- To introduce shell and various editors present in Linux.
- To explain shell scripting, decision making, loops, and functions in shell.

UNIT	CONTENTS	L	T	P	Total Hours
1 (10Marks)	**Introduction:** Need and Evolution of Operating System, Types of Operating System, Functions of Operating System, General Working of Operating System, General Structure of Operating System.	10	02	-	12
2 (15Marks)	**Process Management:** System view of the process and resources, initiating the OS, process address space, process abstraction, resource abstraction, process hierarchy, Thread model.	10	02	-	12
3 (10Marks)	**Scheduling:** Scheduling Mechanisms, Strategy selection, non-pre-emptive and pre-emptive strategies.	08	02	-	10
4 (10Marks)	**Memory Management:** Mapping address space to memory space, memory allocation strategies, fixed partition, variable partition, paging, and virtual memory.	10	03	-	13
5 (15Marks)	**Shell Introduction and Shell Scripting:** Shell and its types, Various editors present in Linux, modes of operation in vi editor, shell script, Writing and execution of the shell script, shell variable (user-defined and system variables), System calls, Using system calls, Pipes and Filters, Decision making (If-else, switch), Loops, and functions in shell Scripts, Utility programs(cut, paste, join, tr, uniq utilities), Pattern matching utility (grep)	10	03	-	13
	Total (in Hrs)	48	12	-	60

Where,   L: Lectures   T: Tutorials   P: Practical

MODES OF IN-SEMESTER ASSESSMENT: **(40 Marks)**
- Two Internal Examination   -   **20 Marks**
- Others   -   **20 Marks**

- Quiz
- Seminar presentation
- Assignment

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DETAILED SYLLABUS OF 4th SEMESTER

Title of the Course	: **OPERATING SYSTEM**
Course Code	: **CCSC406P**
Nature of the Course	: **Core**
Total Credits	: **01**
Distribution of Marks	: **15**

1	Write a shell script to display the list of currently running processes along with their PID, user, and memory usage.
2	Create a file and demonstrate the use of chmod, chown, and ls -l to set and view file permissions.
3	*Write a C program to simulate First-Come-First-Serve (FCFS) or Round Robin scheduling.*
4	Write a program in C to simulate First-Fit and Best-Fit memory allocation strategies.
5	Write a program to implement the Banker's algorithm for deadlock avoidance. Input resources and processes.
6	Write a C program to demonstrate the use of fork(), exec(), getpid(), and wait() system calls.

COURSE OUTCOMES:

After the completion of this course, the learner will be able to

CO1. Understand the basic concepts and evolution of Operating Systems.

CO2. Differentiate between the types of Operating Systems and their functions.

CO3. Understand the process management in Operating Systems and its various components.

CO4. Explain the different scheduling mechanisms and strategies used in Operating Systems.

CO5. Understand the memory management in the Operating System and its various techniques.

CO6. Execute shell scripts.

SUGGESTED READINGS/REFERENCES:

1. A Silberschatz, P. B.Galvin, G. Gagne, "Operating Systems Concepts", John Wiley Publications, 2011.

2. A.S. Tanenbaum, "Modern Operating Systems", 3rd Edition, Pearson Education, 2013.

3. G.Nutt, "Operating Systems: A Modern Perspective", 2nd Edition Pearson Education, 1997.

4. W. Stallings, "Operating Systems, Internals & Design Principles",5thEdition, Prentice Hall of India, 2015.

Title of the Course : **OPERATING SYSTEM**

Course Code : **CCSC406**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	CO1	CO1				
Conceptual Knowledge	CO1,CO3, CO5	CO1,CO2, CO3,CO4, CO5	CO6	CO2		
Procedural Knowledge						
Met cognitive Knowledge						

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	L	L	M	L	L	L	S	L	L	L	S
CO2	L	L	M	M	L	L	S	M	M	L	S
CO3	L	L	M	L	L	L	S	L	L	L	S
CO4	L	L	M	M	M	L	S	M	M	L	S
CO5	L	L	M	L	L	L	S	L	L	L	S
CO6	S	S	M	M	S	M	S	S	S	M	S

Title of the course : DIGITAL DESIGN
Course code : CCSC407T
Nature of the course : Core
Total credits 03
Distribution of Marks : End-Sem: 45TH+15PR, In-Sem: 30TH+10PR

COURSE OBJECTIVES:

- To introduce the fundamental concept of digital design.
- To explain how to represent and manipulate decimal numbers in different coding systems.
- To familiarize with the concept of logic gates and their functions.
- To introduce with combinational and sequential logic design and building blocks.

UNITS	CONTENTS	L	T	P	Total Hours
1 (Marks) 09 TH	**Representation of information:** Review of number systems and their conversions: Binary, Decimal, Octal and Hexadecimal; Positive and negative numbers,	08	02	-	10
2 (Marks) 09TH	**Arithmetic operations and Character codes:** Addition, subtraction, multiplication, division of numbers,1's complement,2's complement to binary numbers, subtraction by using1's complement and 2's Complement methods. BCD, ASCII, Codes for error detection and correction, Concept of hamming Distance.	08	03	-	11
3 (Marks) 09TH + 08PR	**Logic Design:** Boolean algebra & Switching functions, Minimization And Realization using logic gates. Representation of logic functions- SOP and POS, K-map presentation.	08	04	10	22
4 (Marks) 09TH + 07PR	**Combinational circuits:** Designing of Combinational circuits: Adder, Subtractor, Multiplexers, De multiplexers, Decoders, Encoders.	08	04	10	22
5 (Marks) 09TH	**Sequential circuits:** Sequential logic: Latch, Flip flops, Registers and Counters.	08	02	-	10
	Total (in Hrs)	40	15	20	75

Where, L: Lectures T: Tutorials P: Practicals

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DETAILED SYLLABUS OF 3rd SEMESTER

Title of the Course	:	**DIGITAL DESIGN**	
Course Code	:	**CCSC407P**	
Nature of the Course	:	**Core**	
Total Credits	:	**01**	
Distribution of Marks	:	**15**	

1	Verify the truth tables of AND, OR, NOT, NAND, NOR, and XOR gates using a digital trainer kit or simulator.
2	Design and implement a Half Adder circuit.
3	Construct and test a 1-to-4 demultiplexer circuit using logic gates.
4	Verify the truth table of SR, JK, or D flip-flops.
5	Simplify a given Boolean expression using Karnaugh Map
6	Write a program to convert: • Decimal to Binary, Octal, and Hexadecimal • Binary to Decimal and Hexadecimal
7	Perform multiplication and division of: • Binary numbers 📄 *Example:* Multiply 1101×101, Divide $10110 \div 11$
8	Minimize the function using 3-variable and 4-variable Karnaugh Map (K-map) $F(A,B,C)=\Sigma m(1,3,5,7)F(A,B,C) = \Sigma m(1,3,5,7)F(A,B,C)=\Sigma m(1,3,5,7)$
9	Mini-project: Design a **Digital Lock System** using: • Combinational + Sequential Circuits (e.g., password input using D Flip-flops and comparators)

COURSE OUTCOMES:

After the completion of this course, the learner will be able to:

CO1: Learn about different number systems.

CO2: Simplify simple logic functions.

CO3: Create simple logic circuit using logic gates.

CO4: Explain how to design combinational logic circuits. CO5: Understand how to design sequential logic circuits.

SUGGESTED READINGS/ REFERNCES:

1. MorrisM. M, "Digital Logic and Computer Design",Pearson,2022

2. Wakerly J.F., "Digital Design: Principles and Practices",Pearson,5thEdition,2021

3. Kohavi, Z Jha N.K, "Switching Finite automata theory,3/e"Cambridge,2018

4. Salivahanan .S and Arivazhagan. S, "Digital Circuits and Design", Vikas Publishing House PVT LTD, 5th Edition,2018

Title of the course : DIGITAL DESIGN
Course code : CCSC407

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	CO5	CO1				
Conceptual Knowledge		CO5	CO1,CO3	CO2,CO5		CO4
Procedural Knowledge		CO2,CO4				CO3
Meta cognitive Knowledge		CO1,CO3				

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	M	M	M	S	M	M	M	L	S	L	M
CO2	M	M	S	S	S	M	M	M	M	M	M
CO3	S	M	M	S	S	M	M	M	M	M	M
CO4	S	M	M	S	M	M	M	M	S	M	M
CO5	M	M	M	S	M	M	M	M	S	L	M

Title of the course : **COMPUTER ARCHITECTURE**
Course code : **CCSC408T**
Nature of the course : **Core**
Total credits : **03**
Distribution of Marks : **End-Sem: 45 TH+15 PR, In-Sem: 30 TH+10 PR**

COURSE OBJECTIVES:

- To give an overview of the basic structure and operation of a digital computer.
- To introduce different computer memory.
- To explain about the different ways of communicating with I/O devices and standard I/O interfaces.
- To introduce students with assembly language programming.

UNITS	CONTENTS	L	T	P	Total Hours
1 **(Marks)** **09TH** **+** **02PR**	**Introduction to Computers:** Von Neumann Architecture, generation of computers, capabilities and limitations, types of computers: Analog, Digital, Hybrid, General, Special purpose, Micro, Mini, Main frame, Super computers, Personal computers, types of personal Computers–Laptop, Palmtop etc.	06	01	03	10
2 **(Marks)** **09TH** **+** **02PR**	**Organization of a Computer:** Central Progressing Unit (CPU), Register, Stack, Simple ALU organization, Control Unit: Hardwired and Micro-programmed Control.	08	01	04	13
3 **(Marks)** **09TH**	**Memory Organization:** Primary memory, Secondary memory, Cache Memory, Mapping, Virtual memory: address Translation virtual to physical.	09	01	--	10
4 **(Marks)** **09TH**	**I/O Organization:** Modes Of Transfer: Programme driven, Interrupt Driven I/O, DMA, Input Output Processor (IOP), Peripherals, Bus system	08	02	--	10
5 **(Marks)** **09TH** **+** **11PR**	**Assembly language programming:** Addressing modes, Instruction formats, Instruction types, Assembly language programming of Microprocessor 8085.	08	01	22	31
	Total (in Hrs)	40	05	30	75

Where, *L: Lectures* *T: Tutorials* *P:Practicals*

MODES OF IN-SEMESTER ASSESSMENT: **40 Marks**

- One Internal (Theory) Examination   **-10 Marks**
- One Internal (Theory) Examination   **-10 Marks**
- Others (Anyone)   -   **20 Marks**
- Quiz
- Seminar presentation
- Assignment

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DETAILED SYLLABUS OF 4th SEMESTER

Title of the Course	:	**COMPUTER ARCHITECTURE**	
Course Code	:	**CCSC408P**	
Nature of the Course	:	**Core**	
Total Credits	:	**01**	
Distribution of Marks	:	**15**	

1	Write a program or use manual method to convert numbers between Binary, Decimal, Octal, and Hexadecimal.
2	Perform binary addition and subtraction (including signed numbers using 1's and 2's complement).
3	Write and execute 8085 Assembly programs to: • Add two 8-bit numbers stored at memory location 3000H and 3001H
4	Write an assembly program that uses immediate, direct, and indirect addressing modes.
5	Write a program to demonstrate PUSH and POP operations using the stack.
6	Write a program to move data between registers and perform arithmetic
7	Write a program to find the largest number from an array of 10 numbers.
8	Mini Project: Design a simple calculator in 8085 Assembly Language to perform: • Addition, Subtraction, Multiplication, Division (using loops)

COURSE OUTCOMES:

After successful completion of this course, the learner will be able to:

CO1: Understand the basic structure, operation, and characteristics of digital computer. CO2: Describe different components of a computer.

CO3: Describe the memory systems including cache memory and virtual memory.

CO4: Write simple assembly language program.

CO5: Understand different ways of communicating with I/O devices and standard I/O interfaces.

SUGGESTED READINGS/ REFERENCES:

1. Mano M.M,"Computer System Architecture", Pearson, 3rd Edition Revised, 2017.

2. Hamacher.V.C., Vranestic,Z.G.and Zaky,S.G."Computer Organization",Mc Graw-Hill,6th Edition, 2022.

3. Hamacher. C., Vranestic Z., Zaky S., Manjikian N."Computer Organization & Embedded Systems", McGraw- Hill International, 6thEdition, 2023.

4. Ram.B., "Fundamentals of Microprocessors and Microcomputers",5th Edition, Dhanpat Rai Publications, 2018.

Title of the course   : COMPUTER ARCHITECTURE

Course code   : CCSC408

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	CO2,CO4	CO1,CO3				
Conceptual Knowledge		CO1, CO3,CO5	CO2,CO4	CO2,CO3	CO3	
Procedural Knowledge			CO4	CO1,CO5		
Met cognitive Knowledge						

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	S	M	S	S	S	M	M	M	S	L	M
CO2	S	M	S	S	M	M	S	M	S	L	M
CO3	M	M	S	S	S	M	S	M	S	L	M
CO4	S	M	S	S	S	M	S	M	S	M	M
CO5	M	M	S	S	S	M	M	M	M	M	M

Title of the course	: OPERATING SYSTEMS AND NETWORK MANAGEMENT				
Course code	: **MINCSC404T**				
Nature of the course	: **Minor**				
Total credits	: **03**				
Distribution of Marks	: **End-Sem: 45 TH+15 PR, In-Sem: 30 TH+10 PR**				

COURSE OBJECTIVES:

- To introduce the concepts associated with operating system and their design considerations.
- To provide necessary tools for choosing operating system for certain environment.
- To understand the networking concepts.
- To expose the relationship between operating systems and computer networks.

UNITS	CONTENTS	L	T	P	Total Hours
1 (12Marks)	**Introduction to Operating System:** Serial Processing, Batch Processing, Multiprogramming, Operating System Structure, Layered Structure Approach, Virtual Machine, Client-Server Model, Kernel Approach, Classification of Advanced Operating System, Characteristics of Modern Operating System, Micro kernel Architecture, Multithreading, Symmetric Multiprocessing.	06	01	04	11
2 (12 Marks)	**Introduction to Networking Concepts:** Reference models, network topologies, types of network, transmission media, IP addressing, internetworking devices, and media access control.	07	01	03	11
3 (12Marks)	**Linux Operating System:** Features of Linux, components of Linux, Memory Management subsystems Linux Process and Thread Management, File Management System, Device Drivers, Linux commands Utilities and Editor, Some Useful Commands, Permission Modes and Standard Files, Pipes, Filters and Redirection, Shell Scripts, Graphical User Interface, Editor.	08	01	05	14
4 (12Marks)	**Windows 2000 networking: Windows** 2000 Operating System Architecture and services, managing Windows 2000 Server, Using Windows 2000 and Client, Advanced Windows 2000 Networking.	06	01	05	12
5 (12Marks)	**Windows XP Networking:** Introduction to Windows XP Networking, TCP/IP Protocol Setting for Windows XP, Virtual Private Networks and Remote Networking, Sharing Files in Windows XP, Sharing Folders in Windows XP, Sharing Drives in Windows XP, Enabling Offline File Features.	06	01	05	12
	Total (in Hrs)	33	05	22	60

Where,   L: Lectures   T: Tutorials   P: Practicals

MODES OF IN-SEMESTER ASSESSMENT: **(40 Marks)**

- Two Internal Examinations   -   **20 Marks**
- Others   -   **20 Marks**
- Quiz
- Seminar presentation
- Assignment

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DETAILED SYLLABUS OF 4ᵗʰ SEMESTER

Title of the Course	:	OPERATING SYSTEMS AND NETWORK MANAGEMENT
Course Code	:	**MINCSC404P**
Nature of the Course	:	**Minor**
Total Credits	:	**01**
Distribution of Marks	:	**15**

1	Write a shell script to display the current date, time, and list of files in a directory.
2	Create a new user and change file permissions using `chmod` and `chown` commands in Linux.
3	Demonstrate how to connect two systems using an Ethernet cable and share files or ping each other.
4	Use `ping google.com` to check internet connectivity and response time.
5	Draw and explain OSI & TCP/IP reference models.
6	Use terminal like vi/nano editor to demonstrate the following Linux commands: • `pwd, ls, cd, mkdir, rm, touch, cp, mv, chmod, grep, find, ps, top, df, du, tar`
7	Write a shell script to: Print system info
8	Mini Projects: Create a Linux shell script that: • Monitors CPU and memory every 10 seconds • Logs the output to a file

COURSE OUTCOMES:

After successful completion of this course, learners will be able to

CO1: Classify different types of OS.

CO2: Compare different approaches to OS design; CO3: Explain computer networks and their applications.

CO4: Configure Linux OS for a machine as a domain name server and a network file server;

CO5: Describe the concept of distributed file system.

CO6: Configure and manage network devices.

SUGGESTED READINGS/REFERENCES

1. Tanenbaum, Andrew S.; Woodhull, Albert S., Operating Systems. Design and Implementation, Upper Saddle River,N.J.: Pearson/Prentice Hall, 2006,ISBN0-13-142938- 8.
2. Behrouz A. Forouzan, Data Communicationand Networking,4th Edition, TMH 2004.
3. Gouglas Comer, Internetworking with TCP/IP, Volume1, 4th Edition, Prentice Hall, 2000.
4. Resource Kit, Windows 2000 Professional, Microsoft Press.
5. https://www.redhat.com/docs/manuals/linux.
6. https://www.linux.org.
7. https://www.microsoft.com.

Title of the course   : OPERATING SYSTEMS AND NETWORK MANAGEMENT
Course code   : MINCSC404

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge						
Conceptual Knowledge		CO1,CO2	CO2	CO2	CO4	
Procedural Knowledge			CO3	CO5		
Meta cognitive Knowledge					CO5	CO6

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	L	M	M	M	S	L	M	S	S	S	S
CO2	M	M	S	M	S	M	S	M	S	S	S
CO3	L	M	M	M	M	M	S	S	S	S	S
CO4	S	S	S	S	S	M	S	S	S	S	S
CO5	S	S	M	S	M	M	L	L	L	L	S
CO6	S	S	S	S	S	S	L	M	S	S	M